

the assistance of Judge Cooper, in the laboratory of the College of South Carolina, in Columbia, with the same results.

Descriptions of several new species of Cuttle-fish.
Read March 20, 1821. By C. A. LESUEUR.

Having observed many species of the class *Cephalopoda*, and being desirous to arrange them agreeably to the new systematic distribution of this class, which Dr. Leach has published, (in the *Journal de Physique* for May, 1818,) I experienced much difficulty in disposing of one of my species. This species corresponds with those of his first order *Octopoda*, by having eight arms, similar to those of the *Eledona*, &c. and with those of his second order, by the form of the body, and the position of the fin, being similar to those of the species of the Genus *Loligo*. With these characters *it ought to form an intermediate section, between these two orders.*

Dr. Leach has appropriated the name of *Octopoda* to those animals of this class, that have eight arms, and a body destitute of a fin; and the name of *Decapoda* to such as are furnished with ten arms, and with fins which margin the body (or sac) entirely, or partially.

The latter, constituting his second order, are in part referred to a family which he names *Sepiidea* and which is composed of the Genera *Sepia* and

Loligo of Lam, and he places the latter after the *Sepia*.

But the characters which he assigns to this family, do not appear to me to harmonize with those of the genus *Sepia* of Lamark, of which the body is oval, short, sub-obtuse, furnished with fins throughout its whole length; sustained by a very distinct, thick, sub-obtuse bone, which is sometimes armed with a spine posteriorly, is hard and solid towards the back, tender and cellular beneath, and is "*composed of calcareous, very thin, parallel lamina, connected together by thousands of very small, hollow columns, which are perpendicular to their surfaces,* (Cuv. Regne Animal.) Are not these last characters sufficient to distinguish and to separate entirely the genus *Sepia* from that of *Loligo*? inasmuch as this latter genus, on the contrary, has a body enclosed in a sheath, which is long, cylindrical, subulate, narrow, with the fins terminal, united or separate; a very thin, feeble bone, which is often narrow, transparent, sometimes partially gelatinous; this bone or cartilage, which belongs also to the *Sepiola*, appears to me to present a character which ought to approximate the *Loligos* to the *Sepiola*, as Mr. Cuvier has done, (Regue Animal, t. 2, p. 364,) and which will not admit of the interposition of the genus *Sepia*, as in the arrangement of Dr. Leach.

It may then be proper to establish a distinct family for the reception of the genus *Sepia*, to be distinguished by the name given to it by Dr. Leach, of

Sepiidea, with the characters which Mr. Cuvier has assigned to the genus (Regne Animal, p. 365.) For there is good reason to believe, that when the species of the Mediterranean and the other seas, shall be more critically examined, that many species will be discovered, that will require new divisions to be made in this family, as well as in the present genus *Loligo*.

It may also be proper to consider the *Loligos* as forming a separate family. It is of little consequence what characters we select for the distribution of these animals into families and genera, if our arrangement is the most convenient, and exhibits, as near as possible, a gradual transition from one to the other.

The order in which Mr. Cuvier arranged them is very natural, he places the *Polypus* of Aristotle, the *Eledona*, the *Loligo* and the *Sepia* in succession; and the new genus which I shall propose in this essay, may be readily intercalated in the series.

If we observe the form of the body; that of the fins, and their position; the form and the number of the arms; the disposition, the number, and the form of the suckers, their corneous circles either entire or divided, their detentations; the arms which have these suckers regularly or irregularly armed; in fine, those which have nails, either naked or covered by a membrane, upon the longer arms; and those which have nails and suckers; together with the form of the bone; we shall then have characters sufficient for the formation of new divisions.

A careful examination of all the species which exist in the cabinets, and which, from the general form of the body, are regarded as the same, would prove that many distinct kinds have been associated under one specific denomination.

Thus I regarded the species described in this paper, from the collection of the academy, and that from the Philadelphia Museum, as specifically the same, with one of which I made a drawing at Sandy-bay; but upon comparing them with each^a other, they all proved distinct.

In the following arrangement I have considered the form of the body, the number of the arms and their armature. To the family I apply the name of *Loligoidea*, of which the genera may be divided into those which have not long arms; and those which have long arms, and finally, those which have simple nails; those which have nails and suckers; and those which have suckers only.

FAMILY LOLIGOIDEA.

CHARACTERS.—Body enclosed in a sac, which is elongated, narrow, cylindrical, subulate posteriorly; fins terminal, united or separate; bone very thin, more or less transparent, sometimes partially gelatinous; arms as in the *Sepia*, with or without long arms.

* Arms sub-equal.

GENUS 1st, LEACHIA.

Eight unequal arms, the third pair longer and more robust.

L. **cyclura*. Terminal fin orbicular; head small; eyes large, prominent; body coniform.

Inhabits the Pacific Ocean.

Total length from the extremity of the tentacula to the tip of the fin five and a half inches; body three inches; tail one inch; the long tentacula one inch and a half. The first pair of tentacula very short, second pair longer, third pair still longer and more robust; inferior pair nearly equal to the superior ones; terminal fin orbicular, slightly embracing the tip of the body; *color*, tentacula and superior portion of the head light blue; *body* and *tail* tinged with bluish and red, irrorate with red points, ornamented with several irregular spots of a deeper red, and with remote, transverse, black, abbreviated lines, two large light brown, suboval, dorsal spots behind the middle, preceded by a black spot, and with a red one posteriorly.

This description is taken from a drawing made by Mr. Petit, from a specimen obtained in the Pacific Ocean, in lat. 37° South, and long. 33° East.

** Having long arms, furnished with suckers.

GENUS 2nd, LOLIGO, *Pliny. Lam.*

Fins, united, pointed at the base.

SPECIES.—1. L. **Bartramii*. Arms sub-compressed, with a large membrane at their inner angles.

The *sac* in this species is very firm, cylindric to the base of the fin, where it contracts, and terminates

in a point; *fins* united, entire, forming the third part of a circle, of which the center is the extremity of the tail, they are superposed, terminated each side by an angle, thick upon the posterior side, very thin and pellucid on the anterior; *head* cylindric, truncated behind, so as to enable it to close the sac; *neck* on each side furnished with three small, rounded, compressed appendices, placed longitudinally; *eyes* free in their orbit, of which the aperture is small, with an anterior lacrymal emargination; no membrane annexed to the orbit for covering the eye. Ten arms, furnished with suckers, which, on the extremity of the long arms, are disposed in four series, with the larger ones central; the other eight arms have but two series, which extend from the base to the extremity. These eight arms are unequal, the first pair smallest; second pair longer than the first; third longer than the second, much compressed, and furnished with a large membrane interiorly and towards the anterior extremity; the fourth and inferior pair, as long as the second, the suckers oblique, elevated on the exterior, and depressed on the interior side, armed with a corneous, denticulated circle, the peduncles of the suckers repose upon the base of the transverse vermiform muscle, with which the interior lateral membrane is furnished; the two long arms feeble, slightly compressed, dilated at their extremity, which is margined on each side by an undulated membrane, and towards the superior extremity opposite to the suckers by another membrane; *beak* concealed and co-

vered by a folded sphincter, which is furnished with six very short appendices, hardly surpassing the folded membrane of the mouth; *bone* very narrow, corneous, feeble, transparent, enlarged a little anteriorly, gradually diminishing, cylindrical, and terminated by a small hollow cone posteriorly, margined each side by two strong lines, in the middle by a single line; *color* violet-blue, passing into purpleish on the back, head and tail; a narrow, longitudinal, yellowish band on each side of the back; sides of a pale blue; beneath white; brown points disseminated over all the body, but more numerous above.

2. L. **Pealeii*. This species, which appertains to the fine collection of the Philadelphia Museum, was politely confided to my care, for examination, by the manager of that interesting and superb establishment Mr. R. Peale. It appears to me, not referible to any of the species figured by Seba, nor of those published by Montfort.

The sac is solid, firm, cylindrical, gradually attenuated to a point, and furnished with a flat appendice anteriorly; *fin* terminal, more than half as long as the body, united in a point posteriorly, lateral angles rounded, lateral and posterior sides thickened, anterior side thin, surface with transverse striæ, formed by small muscles; *head* small, compressed, with a small transverse membrane each side below the eyes; *neck* small, short; *eyes* covered by a mem-

brane; *arms* eight, of which six are subtriangular, the two superior ones a little shorter than the second pair, which are equal to the inferior pair, third pair very strong, rounded, and depressed, longer than the others, furnished with a membrane at their exterior part; all the arms furnished with two series of suckers, which are hemispherical, alternate and pedunculated; the *disks* are obliquely truncated, most elevated on the exterior side, beneath indented for the attachment of the conic peduncle, they are armed with six horny brown teeth above, of which two superior ones are narrow and pointed, and the four others broader; inferiorly and upon the narrow side of the disk is a long, horny, brown lamina; the *two long arms*, are subcylindric, dilated at their extremity, margined on each side by an undulated membrane, upon which the peduncles of the suckers repose; four series of suckers, of which the middle series are largest, and terminated at each extremity by smaller suckers; *disks* hemispheric, transversely truncated, armed with a corneous circle, and having strong remote teeth, with two or three smaller intervening ones, in the central disks; but I have not been able to determine the number of intermediate teeth in the lateral disks; besides the thin lateral membrane, there is another thicker one, placed obliquely upon the enlarged extremity of the long arms; the opening of the mouth, has three concentric folds, the exterior one of which is furnished with a much folded membrane, which is terminated

by six small appendices, or false arms, furnished with several suckers at their extremities, the two inferior appendices shorter.

The *bone* is broad, naviculiform, terminated in a point at each extremity, thin at the margin, carinated, and a little more robust at the anterior extremity, which is narrowest.

The superior part of the head, of the tentacula and of the back covered with reddish-brown points, which are less numerous upon the sides and abdomen.

Coast of South Carolina?

When Mr. Maclure and myself were at Sandy Bay in 1816, we saw a great number of *Loligos* collected by the fishermen, and held in reserve as bait for Cod-fish, which they catch in great numbers on the banks of Newfoundland. The beautiful color with which they were ornamented, induced me to take a drawing of one immediately, but not then having leisure to complete it, I took a specimen with me to finish the drawing at my leisure. But recently upon comparing this specimen with my drawing, I was much surprized to perceive that I had brought with me a very distinct species from that which I had observed. I mention this circumstance to explain the cause of the brevity of the following description, taken from my drawing.

3. *LOLIGO *illecebrosa*. The body of this species is rather short, narrow, subequal anteriorly, terminated acutely posteriorly; *fins* approximated at their origin, terminated in a point, and taken together rhombiform; the two longer arms are narrow, dilated at their extremity, and furnished with two series of suckers, the eight arms are almost equal and provided throughout their whole length with two ranges of suckers; the arms are long, and with the head they measure two-thirds of the length of the sac; the bone is very narrow in the middle, dilated at each extremity, and terminated at the inferiorly by a hollow inverted cone.

Colors vivid and beautiful, passing from a brilliant red to a deep and clear blue, upon the back, the head, arms, tail, and fin, which are covered with deeper points of the same color, the under part of the body is paler, region of the eyes finely tinted with yellow.

This species is known by the name of *Squid* at Sandy Bay, and is made use of by the fishermen as bait in the Cod-fishery.

4 *LOLIGO *Bartlingii*. Lateral arms compressed, and with the inferior pair, furnished with a membrane upon all their exterior length.

This species for which we are indebted to captain Bartling, who obtained it in the Gulf Stream, forms part of the collection of the Academy. It differs from the preceding by its arms, which are generally longer, filiform at the extremity; a broad, thin and

softer fin is situated at the superior part of the tail; its body also is larger. The bone presents a still greater difference, in being very much compressed at the base, and a little dilated at the opposite extremity.

Color, deep blackish brown; the four superior *arms* being very much compressed, have their interior surface very narrow and destitute of a lateral membrane; the suckers are very small and crowded, and seem to form but a single range, though in reality they are disposed in two series and are alternate; the eight arms are furnished with suckers throughout all their length, and are unequal, the inferior ones being longest, and the others diminishing gradually. The *long arms*, the extremities of which had been cut off by the fishermen, appear to have been very long; *suckers* hemispheric, placed upon a short peduncle; corneous ring, broad and mutic; the *body* is inserted very deep in the sac, which renders it very free at the superior part; *eyes* free in their orbit, which is dilated, rounded, destitute of nictitating membrane, and furnished with a lachrymal emargination anteriorly; body, back and tail covered with reddish brown points; a slightly depressed line on the superior part of the sac.

5. L. **Pavo*. Sac much elongated, rounded; eyes very large; arms very short, depressed; fin cordate, terminated in a point; bone very narrow anteriorly, somewhat dilated posteriorly, and subgelatinous.

October 1821.

This species is remarkable by its elongated, pointed, and very soft sac; by its bone, which is sub-equal in its greater length anteriorly, and enlarged towards the base, where it is terminated in an obtuse point. The fins are united and oblong-cordate, entire at base, and spreading from the sac, which is narrow, smooth, and, as well as the head and arms, covered on every part with very large ocellations, which are connected together by smaller intermediate ones. General colour, deep carmine-brown; head small; eyes large, prominent, and directed more forward than laterally; neck narrow, short; arms very short, furnished with two series of suckers, supported by narrow pedicles, which are fixed upon the margin at the base of the membrane and towards the narrowest side of the sucker, which is truncated very obliquely, the larger side being exterior, and the narrower interior; they are also distant from each other; the arms are destitute of lateral interior membranes; the large arms are thin.

I have not been able to ascertain whether this species is armed with hooks or suckers. The tips of the small arms, as well as the greater portion of the larger arms, had been cut off by the fishermen; an operation which they perform upon all they capture, for fear of receiving injury from them.

Length of the sac 10 inches. The figure represents the animal half its natural size; it was a female, the oviduct of which was exerted and pendant, as represented in the plate; it is an aggregation of small,

white globules, attached and sustained by a membrane.

Sandy-Bay, 1816.

*** Having long arms, furnished with nails, with or without suckers.

GENUS 3d. *ONYKIA.

O. **Carribæa*.—Arms eight, unequal; tentacula two, elongated, and armed near their extremity with suckers, and with corneous hooks, concealed, each in a membranous sac; fin truncated.

Inhabits, amongst fuci, in the Gulf of Mexico, and in the Gulf Stream.

Head rounded, short, crowned by eight arms and two tentacula; eyes large, lateral, and but little prominent, pupils black, iris blue; body enclosed in a sack, cylindric anteriorly, conic posteriorly, and terminated at this extremity by a sub-triangular fin, of which the inferior angle is truncated and rounded; the space between the origins of the wing which forms this fin is 2 lines long; their extent from one angle to the other, is 8 lines, their length is 6 lines; the diameter of the sack anteriorly 6 lines.

The eight arms are, in all their length, each furnished with two series of suckers; the two superior arms are the shortest, being only 10 lines in length; the six others are 9 lines long; the tentaculæ are one inch and an half long, and are armed at their extremity with two series of incurved hooks, which alternate with suckers at their bases; the series of suck-

ers extend further towards the head, than those of the hooks. These curved horny nails are each covered by a membrane when at rest, which resembles a small pocket. The inferior arms are furnished with a small longitudinal natatory membrane upon their exterior side, and at their base; the lateral arms have also a membrane towards their extremity and above. Colour, as usual in the species of this family, varying from a blue to a purple, or yellow, &c.

Total length from the extremity of the tentaculæ to the tip of the fin, 3 inches.

Head 5 lines; tentaculæ 1 inch and an half; body 1 inch.

OBSERVATIONS.—I have had for some time in my possession, a drawing of a *Loligo*, which was obtained during a voyage from the Canary Islands to the Isle of France, in latitude $36^{\circ} 40'$ south, and longitude 29° east. This drawing, which was executed by Mr. Petit, is very finely coloured; but as it is not sufficiently detailed, it was regarded as inadequate to establish the certainty of the existence of the species which it represented. All doubts, however, are now dissipated by our observations upon the species of the Gulf Stream, and by those recently published by Dr. Leach upon a species of the coast of Africa. Although Mr. Petit's drawing is not calculated to exhibit minute characteristics, yet the following differential traits are remarkable. The hooks are but slightly curved, and destitute of suckers at their base, the fin is rhomboidal, prolonged to a point at the

extremity. To this species I have applied the name of *O. Angulatus*. It has eight unequal tentacula, the two superior ones shortest. Total length from the extremity of the tentaculæ to the tip of the fin, 10 inches; *body* 5 inches; *head* very small, 8 lines long; the two superior tentacula 1 inch and 9 lines; the long tentacula 5 inches.

SEPIOLA cardioptera. Peron.

Peron has left no description of this species, which we saw in latitude 31° south, and longitude 48° east; the species appeared to belong to the genus *Sepiola*, and perhaps even to the unguiculated ones. The habit of living in many seas, amongst the fucus which floats upon the surface of the waters, is similar to that of the Gulf Stream, which is furnished with horny nails upon the long arms, as described above.

OBSERVATIONS.—I subjoin the names of the species that Peron and myself observed in New Holland, in order to note their existence. I have sent descriptions of them to France.

Peron designated them by the following names:

1. *SEPIA sepiola*. Peron. Very small.

Inhabits the coast of Endrach, in New Holland.

As this species does not appear to be the *sepiola* of Lin. I propose for it the name of *minima*, as it is very small.

Family of SEPIEDEA. Leach.

2. *SEPIA octopa*. Peron. Very small.

Inhabits the island of Dorre, Shark Bay.

This species can hardly be the *octopus* of Lin. I propose, therefore, the name of *Peronii* for it.

3. *SEPIA rugosa*. Bosc.—I do not think that our species is the same with that described by Bosc; I therefore propose for it the name of that naturalist, *Bosci*.

4. *SEPIA varietas*. Peron.

Inhabits the small island of Dorre.

The shores of King's island were covered with *Sepiæ*, many of which were living. We there observed also many groups of their eggs.

REFERENCE TO THE PLATES.

Plate 6. LEACHIA CYCLURA.

Plate 7. LOLIGO BARTRAMII.

fig. 1. lateral view.

" 2. dorsal view.

" *a. b.* sections of the arms magnified, exhibiting front and lateral views of the suckers.

" *c.* a portion of the skin of the body magnified.

" *d.* beak.

" *e.* bone.

" *f.* transverse section of the bone.

Plate 8. LOLIGO PEALEII.

fig. 1. dorsal view.

" 2. side view.

" *a.* bone—front view.

" *b.* bone—side view.

" *c.* beak, sphincter, and appendices.

" *d. d. d.* suckers, magnified

Plate 9. fig. 1. ONYKIA CARRIBÆA, dorsal view.

" 2. do. do. lateral view.

" *a. b.* bone—profile, and front views.

" *c.* transverse section of the bone.

" *d.* extremity of one of the long arms magnified.

" *e.* hook and sucker, magnified.

" 3. ONYKIA ANGULATUS.